The Prediction of Success In The Training of Canadian Parachutists

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THE PREDICTION OF SUCCESS IN THE TRAINING OF CANADIAN PARACHUTISTS

A DISSERTATION
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
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ABSTRACT

The purpose of this study was to determine whether or not failures on the parachutist course differed significantly from those who pass in relation to personality variables and motivation for the course. On the basis of related studies, interviewing successes and failures on the course over a period of time, and consideration of experienced instructors opinions, two sets of items were assembled to sample these two areas. From the Minnesota Multiphasic Personality Inventory, 110 items that were thought to sample critical traits for parachutists were chosen, and 75 items were devised by the experimenter for the interest and attitude items. This group of items was administered to a group of 558 students who attended the parachutist course at Canadian Joint Air Training Corps from June 1954 until March 1955. An item analysis was done using the administrative pass-fail decision as a criterion. Those items that were significant at the .10 level or better were retained and formed into scales. The first scale (X) sampled personality variables and the second scale (Y), sampled motivation.

These scales were scored on both the validation group, N = 558, and the generalization group who attended the course from March 1955 to March 1956, N = 869. Critical ratios were computed to determine if the scales were differentiating significantly between the passes and fails. Correlations were computed as an estimate of each scale's ability to control variance in the performance on both the validation and generalization sample. An analysis of the test results in relation to

the pass-fail administrative criterion indicates that the tests can predict at a significant level.

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CHAPTER I

INTRODUCTION

Armies in many countries have found it difficult to select individuals for parachutists training in a manner which will prevent excessive wastage from failure to qualify. Many studies have assumed that the point of view of personality factors are crucial to success in this area. Such studies will be reviewed and their applicability to the Canadian situation indicated.

For the present study, it was decided to approach the problem from the standpoint of both personality and attitudes, selecting indicative questions (test items) which would be appropriate.

A. Description of the Parachutist Course in the Canadian Army

The course to train parachutists is of four weeks duration and is conducted at the Canadian Joint Training Center (CJATC) at Rivers Camp, Manitoba. In general, the purpose of the Basic Parachutist Course is to teach the soldier the skills involved in exiting from an aircraft in flight and descending safely by parachute. The instruction is divided into three phases; teaching the exit drills, teaching the rudiments of flight with a parachute, and finally teaching the landing techniques. In addition, of course the student is taught the

component parts and the operation of the T7 and T10 parachutes and is familiarized with both the C47 and C119 aircraft.

During the first week, the Physical Efficiency test is administered. It is not properly part of the course and is designed to measure whether the student is physically capable of completing the training. Units sending candidates are supposed to have administered this test before their despatch. CJATC also gave the test to students on arrival and because they often did not agree with the units on the score that should be assigned to a student, the test is probably of doubtful reliability. In addition, there is synthetic ground training on mock-up aircraft fuselages, landing swings and slides.

The second week consists of continuation of the synthetic ground training along with practice exits from the mock tower. The mock tower was originally designed as a training aid but it also acts as a rather potent selection device. Most of the failures occur here through failure to perform adequately. The student is required to exit 8 to 15 times in a certain fashion. The apparatus is a tower 32 feet high with a platform shaped like the C119 aircraft fuselage. It is fitted with cables that run above and beside the mock tower to a mound of dirt about 200 yards away. There is a free drop of about 10 to 15 feet ending in a considerable jar as the "risers", fastened at one end to the students harness and at the other to the cables, take up the slack.

The third week of the course is concerned mainly with developing further the skills of manoeuvring the parachute in the air and landing safely. The high tower is the apparatus used and the duration of training is from two days to one week, depending upon the wind. The high tower is 256 feet high and the parachute used is somewhat larger than the T7 parachute although it is about equal in size to the T10 parachute. It is held open at all times by a system of cams. The student is fastened in the harness on the ground and is then lifted by means of a hoist and a block arrangement which releases the parachute when the top of the tower is reached. There is no immediate voluntary act involved such as jumping from the mock tower.

B. Related Studies

The Russian study. A Russian study (5) designed to examine the effect of parachute jumping on the human organism appears to be one of the first done in this area. The paper was prepared by the Pavlov Institute of Aviation Medicine. The work of Makarov is cited in which he relates the psychological variants that appear on a final check test flight of prospective parachutists.

> First-type variant (76 per cent): Persons in an excited lively state characterized by a cheerful, excited mood, easily distracted attention, rapid speech, flushed face, a lively expression, mimicry, lively gestures, and general movement.
>
> Second-type variant (14 per cent): Persons who are in a frightened condition characterized by distraction of attention, pale face, dilated pupils, a dejected expression, slowing of gestures and general movement. Doubt, fear and terror are frequently observed.

Third-type variant (3 per cent): Those persons in a depressed mood, lack of confidence, sluggishness, pale face, yawning, nausea, occasionally vomiting and tachycardia; complaints of constriction in the cardiac region, gas noises in the abdomen, desire to defecate and weakness.

Fourth-type variant (7 per cent): Mixed reactions, characterized by a combination of the second and third-type variants.

Makarov believes that a single test flight is enough to accustom the first group, additional test flights might be necessary for the second group, but the third and fourth groups are still more doubtful and several flights or removing them from the list of prospective candidates may be necessary. The author (5) of the report believes that this is too complex to be suitable for systematic selection and suggests simplifying this system by identifying only two categories. The first group (excited condition), comprising the majority of trainees, is characterized by motor and speech excitement, a lively and cheerful mood, and sometimes by easily distracted attention and difficulty of concentration. The second group (alarmed, depressed condition), which is not large, is characterized by immobility, silence, occasionally some depression, or by indifference to surroundings.

The British study. In the British forces, selection of prospective parachutists is done at the Airborne Forces Depot. The psychiatric selection is reported to be complementary to regimental selection and each is dependent on the other. The psychiatric selection is based on both tests and interview. The tests administered are as follows: Questionnaire

No 1 which is mainly a biographical data sheet; Questionnaire No 2 which is a medical history; a Word Association test, a Thematic Apperception test with four classical slides and one local variant picturing a parachuting scene, a short Self Description test, the Maudsley Medical Questionnaire, a Word Connection List, Progressive Matrices, and a Personality Inventory of 110 items taken from the MMPI.

The students are kept at the Airborne Forces Depot for two weeks under observation. They go through various gymnastics and are interviewed periodically by their platoon commanders. The results of these observations and interviews along with the psychiatric tests and interview are integrated in a final conference attended by a psychiatrist, personnel officer, and regimental officers. The paper states that regimental and psychiatric selection agree about 90 per cent of the time. The failure rate on the subsequent parachutist course is about 2 to 3 per cent.

There are no data available on the failure rate in the Regular Army before this selection scheme was introduced. One can compare this wastage rate with the 8 per cent failure rate in the Territorial Army. It should be remembered however, that the course that the Regular Army and the course the Territorials take differ somewhat and are therefore not strictly comparable. Another comparison should be made with the wastage rate of 15 to 20 per cent in the Canadian and American forces where no such elaborate selection scheme is in effect.

The low wastage rate on the actual course is achieved at the cost of rejecting 40 to 50 per cent of the original candidates who arrive at the Airborne Forces Depot. Just how efficient this selection technique is cannot be determined because no studies have been done to the writer's knowledge to determine the number of false negatives that have been misidentified. Again it must be remembered that their ultimate aim, which is not stated in the paper, may be considerably more long range than just predicting the pass-fail criterion of performance on the parachutist course. In other words, they may be attempting to identify the stable personality required in the hazardous duties of parachuting that may or may not be an important variable on the course. There are, however, no standardization data available on the tests that are used.

Because the selection system used by the British regular Airborne Forces took two weeks to complete, their Territorial Army (Airborne) was in need of a system that was more economical both of time and effort. A series of studies were carried out during 1953 to find a short and objective testing-selection system (9).

Eysenck's system of classification of "Dimensions of Personality" was adopted because it had been empirically derived and is capable of expression in terms of objectively determined quantitative variables (9). In the British study the following hypotheses were set up for testing:

> That successful parachute jumpers will consistently differ from those who refuse to jump in terms of Eysenck's general personality factors of neuroticism.

> That "passes" will consistently differ from "refusals" in that the latter, have, or imagine they have, more physical ailments or complaints.
>
> That "passes" will consistently differ from "refusals" in terms of Eysenck's bipolar factor of introversion-extroversion (anxiety-hysteria), refusals being more introverted ("anxious") than jumpers.

Another variable was also investigated. It was decided to investigate how the motivational attitude of the subjects affected their results. This was to be done by determining if the results of one group of subjects, who thought that their acceptance depended upon their performance on the tests, differed significantly from the group who were told that the testing was just an experiment with no practical implication.

Two questionnaires were used. The first was a combination of a neuroticism scale (X scale) and a 24 item physical health scale (Y scale) with the addition of 10 items to form a "lie-scale". The second was a 36 item anxiety hysteria or introversion-extroversion scale (H scale). These were based on scales used in research at the Maudsley Hospital, on the MMPI, and on scales by Cattel and Stouffer. The H scale was administered only to those subjects who made borderline scores on the X or Y scale.

In preliminary testing, it was found that there were no significant differences between the scores of motivated and unmotivated subjects. This preliminary testing was carried out using the results of the selection course at the Airborne Forces Depot as a criterion. The X and Y scale differentiated passers from failures at the .001 and the .01

level of significance respectively. The Z and H scales did not differentiate significantly between these two criterion categories.

In the main study all men were tested in a Territorial Army Parachutist Brigade before commencing parachutist training. It was found that none of the experimental scales differentiated significantly between those who passed and those who failed the subsequent course. The interesting result of this study is that the experimental scales showed a significant difference between the successful and unsuccessful candidates at the Airborne Forces Depot two weeks pre-selection course but failed to vary systematically with performance on the actual course.

The American study. A team of American social scientists performed a series of experiments during July-August, 1951 and March-April 1952, at Fort Benning (6) investigating covariance of several dependent variables with the independent variable anxiety which they thought would arise consistently in the stress situation of parachuting. Specifically, their purpose was to determine in what way the emotional state aroused by the stress of airborne training is similar to free anxiety; to determine the effects of this stress on various psychological functions such as visual perception, memory and intellectual control; to determine the relationship between certain biochemical indices known to vary with free anxiety and stress; to study relationships between experimental measures of stress reaction and actual performance in training; to study relationships among stress reactions at different levels of biological

organization; to determine the changes in stress reaction, as measured in these studies, during the course of training; and to determine the relationships between the initial personality and subsequent reactions to stress.

Very briefly, the design endeavoured to establish base levels in the various measures before the presumed stress of parachutist of the course. There was a clinical interview designed to explore the psychological history of the individual with special emphasis on his characteristic modes of reacting to stress, his defences and the degree and type of personality disturbance. Subsequently, the subjects were interviewed periodically during the course. The Tachistoscopic Bender-Gestalt test, an anxiety Self-Rating scale, a Tachistoscopic Closure, and Memory for Digits test, were the objective measures used in relation to psychological functioning.

For the purpose of this study, anxiety was defined as the "conscious and reportable experience of intense dread and forboding conceptualized as internally derived and unrelated to external threat". Although the total field of anxiety requires the study of basic psychosomatic-social relations the study as such is the study of feeling states and requires psychological methods.

The authors (6) conclude that parachutist training did not create a high level of anxiety. The focus of anxiety in this situation was found to be allied with the subjects anticipations of failure rather than of death and destruction. Shame-anxiety could be differentiated from harm-anxiety even though

they were highly correlated. The more disturbed the individual, the more highly correlated were the measures. They believe that shame-anxiety may more frequently lead to facilitation of performance while harm-anxiety has more disruptive consequences at lower levels of intensity.

It was expected that experimental measures of stress proneness and stress response used in these studies should be related to the adequacy of performance. It was found that the failures differ somewhat from the passing group both in initial assessment and in repeated tests. They were judged as being somewhat more anxious and as having fewer resources for coping with stress; and during training they reported more anxiety. Although in repeated measures, both psychological and biochemical, they generally showed more evidence of stress response, the differences between passers and failures were often not large and sometimes non-existent.

A more sensitive index of adequacy of performance caused these differences to disappear largely. There does not appear to be a continuum between those who passed easily, passed with greater difficulty, and failed in relation to a rising level of anxiety over failure. Those who failed were more clearly differentiated by their harm-anxiety ratings; poorer passers were better differentiated from good passers on the basis of failure-anxiety. Over the whole range from failures, to poor passers, to good passers, there was a definite discontinuity.

The authors (6) concluded that often subtle personality characteristics define the manner and degree to which men respond psychologically and hence somatically, to stressful situations and this is frequently overlooked in laboratory and clinical research. Stress is an experience that cannot be defined independently of the life situation and response to it. However, they thought that one should be able to predict those who will react with varying degrees of liberated anxiety, with development of new or intensification of old psychological defences, or with collapse in performance and behavior to ultimate flight from the situation. However, the central focus was on stress and anxiety and the authors state that neither a knowledge of anxiety nor of its coordinate biological psychological processes is a sufficient basis for prediction of the adequacy of performance.

The Canadian study. A Canadian study (4) was done in 1950-51 with the object of determining if a subject's MMPI profile had predictive value in relation to his course performance. The MMPI's were administered before the course and were then examined in relation to the subject's performance on completion of the course. The sample consisted of 566 successes in 16 regular parachutist training serials and 49 failures found in these same 16 serials. Failures tended to make significantly different scores from the passers on the Lie and Depression scales; differences of less statistical significance were found on F, Ma, and Mf scales. An "attitude

towards failures" scale along with a "motivation" scale based on attitudes towards the extra pay were other scales used in the study. The author (4) claims to have noted a difference approaching a significant level only on the Attitude to Failure scale. He states, "There seems to be little motivation by the extra pay or being a member of a jumping group." The reliability of these observation is at least doubtful as the author placed the subjects on a rating scale as a result of an interview. The evidence is too meager to either prove or disprove the attitudinal hypothesis.

C. Limitation of Related Studies

Those who have attempted to measure and predict the performance of students on parachutist training have thought almost without exception that personality variables are of some importance. In addition, those who have experience in training parachutists insist that the student's interest in the training, and the attitude of their close relatives are both of great importance. It would seem that each plays an important role in contributing to the ultimate success or failure of the student on the course.

Although all previous studies in this area have attempted to assess the relation of personality variables to the problem of predicting success in parachuting only one has attempted to assess such factors as motivation, attitude to the course, attitude toward the extra pay, etc. However, this attempt to measure motivation was done on the basis of the subjective judgment of an interviewer using a rating scale. It was thought that further development of the attempt to measure

such attitudes on an objective basis would be worthwhile

D. Theoretical Considerations

There are several authorities to whom we might have turned for a rationale in the design that was anticipated. Thorndike (13) states that there are two approaches to the manipulation of such data. The first is the analysis of the relationship of each item to the total test score (internal consistency analysis); the other approach is that of an analysis of the relationship of each item to an external situation (item validation). These are two extremes in the approach to scale and test development but it is significant to note, however, that as validation of the single items becomes more meaningful, internal consistency analysis becomes less meaningful and the more appropriate internal consistency analysis is, the less one may expect item validation to contribute. In this instance internal consistency is of minor importance.

The basic assumption which is implicit in the selection of the items is that performance on parachutist training is not determined by a single unitary trait but is likely to be multi-determined. Cronbach (3) states that personality inventories attempt to describe individuals in terms of personality dimensions or traits. He defines a trait as a "tendency" to react in a defined way in response to a defined class of stimuli". The existence of traits may be demonstrated by the considerable consistency that personalities reveal, by the fact that habits are found in different degrees or amounts in individuals and by the stability of personalities in that persons who

possess a certain degree of a trait at one time, usually show a similar degree at a later time. The trait approach offers no less than 17,953 adjectives describing traits. These traits names often overlap and when these synonoms are eliminated we are still left with 150 trait names according to Cattell. Cattell (2) has further reduced these 150 trait names to twelve through factor analysis. However, Laver (11) criticizes this simplification because "factors must be interpreted within some theoretical framework, which will in fact, determine rotation of the factors, and interpretation of meaningfulness in the factorial matrix. Thus it is possible to criticize some of Cattell's twelve basic factors as combinations of two or more dimensions of behavior."

Few psychologists today think that traits exist independently and act in isolation. Although the excision for detailed study of a single trait would not necessarily imply this approach if one were then to take the next step and predict behavior on the basis of this single trait, he would be neglecting the majority emphasis on the dynamic organization and constantly shifting pattern in personality. In addition different environments facilitate different behaviors and the large part that this plays in personality in action would have also been neglected. One must as much as possible, take account of the constant interaction of traits with one another and with the environment. Guilford's (7) discussion is pertinent:

> The point is that success in any sphere of life is highly complex and is determined by many psychological factors in the individuals competing, rather than one or a few. If we measure success in a complex activity by

> singling out as criteria one or more of its aspects measuring them, we are checking upon the validity of the test or tests for predicting those chosen aspects. We should, of course, attempt to single out the most significant aspects as criteria. Too often some inconsequential aspects are chosen because of their ready observability and measurability.

The a priori theoretical approach to test construction where personality factors appear to be an important variable, must assume that certain traits exist, can be measured, and are related to success. This is perhaps making more assumptions than are necessary or warranted and because of this it may be undesirable. An empirical approach need only postulate that personality variables and attitudes appear to be important in performance. However, using the empirical procedure, one cannot at the end of the procedure say more than this test differentiates the less successful from the more successful at a certain level of significance or that the test controls a certain amount of the variance in the criterion. The generalizations that can be drawn certainly cannot be extended beyond the population from which our sample is drawn. Perhaps this is all that one can expect in an exploratory study. The empirical approach has been picturesquely described in this way, "The test becomes a sort of camera. It takes a snap shot encompassing bits of many traits that have in common only relationships with the criterion. This snap shot we may compare with the criterion idea." (11).

Guilford (7) describes a "shotgun" approach which he says gets results without much knowledge of why there is validity. An example of this approach is the Biographical Data

Blank developed by the AAF which correlated responses to a large number of items about the student's previous life and experiences with the graduation-elimination dichotomy in aircrew training. Valuable use can be made of this technique in an unknown sphere of prediction. Guilford is dissatisfied with the results as a finished product and thinks that one should go beyond this stage as soon as possible by finding out the underlying reasons for successful prediction and then improving the measuring instruments.

Previous research was neither careful enough nor of the right kind to assist in identifying one or more unitary traits crucial to parachuting even if they do exist. Because of this the experiment was forced to take the form of an exploratory study. It was decided to administer the items to a large validation group, carry out an item analysis against the pass-fail criterion on the parachutist course, select those items that discriminate at a fairly lax level of significance (.10) and combine the items that sample personality variables in one scale and items that sample interests and attitudes in the other scale. If the scales demonstrated that they were able to differentiate the pass-fail groups significantly on the generalization sample in addition to the validation sample, it was planned to compute intercorrelations between the two scales and thus through a multiple correlation arrive at some estimate of the variance controlled on both samples.

If an item analysis was to be carried out some consideration had to be given to the measures available so that the one most suitable to our purpose might be selected. A further

discussion of our criterion is necessary here. The course yields seven categories ranging from a clear average to what is termed a psychological failure. Closer examination however, reveals that there is no logical or objective manner in which one can place these gradings on a continuum with "psychological failure" to "clear average" as the extremes. First we do not know whether the physical efficiency test has any relationship to such a pass-fail continuum; again some of our disciplinary failures were above average in their training before committing their offence. Some of the medical failures did not actually have an opportunity to start the course because of a low medical category and some of the injuries were not caused on the course. The categories of low average and below average passers and the standard of training failures are of course based on what Thorndike (13) calls summary performance records or summary evaluations. Only the average, below average, standard of training failures, and psychological failures might be put on a continuum with any assurance, but even this might be questionable.

The only alternatives would be either an extreme group study or a study selecting one group and contrasting it with the rest of the population sample. If we chose the first, we might be throwing away data, if we chose the second, we might find that real differences that do exist have been obscured by groups that have no relation to the criterion. It was decided that in situations where there is a marked doubt about the meaning of the various categories of performance it would be safest to use the administrative decision. This would yield

a dichotomous pass-fail grouping and is perhaps the most rigid test that could be applied to the discriminative power of the items.

If all subjects had been allowed to go through the parachutist course and if fine enough objective measures were available, it is almost certain that one could theoretically place the subject's performance record on a continuum from those with the least aptitude to those with the best aptitude for parachutist training. The reported discontinuity found by Grinker and associates (6) could easily have been an artificat of their measuring instruments or of their theoretical viewpoint. The normal expectancy in such a situation of a dichotomy imposed on a continuous, normally distributed, variate probably holds - at least until more telling experimental evidence refutes it.

Each of the 185 items permitted only one of two responses, "true" or "false". The subjects followed the instructions to answer all items in all but a very few cases so a third category was not necessary. Examination of the item responses would suggest that many of the distributions underlying the enforced, artificial, "true-false" dichotomy were not normal. The Interest and Attitude items are especially suspect along with some of the more extreme behavior items taken from the MMPI. Allport (1) has said in this respect, "The more any quality depends on chance biological determination the more likely it is to be normally distributed..... A large number of instances of social conformity have been

studied, always with the same result. What appears in place of a normal (chance-biological) curve is J-shaped distribution."

Having decided that there was probably a continuous and normally distributed variate underlying the dichotomous criterion and continuous but non-normally distributed variates underlying the items, it remained to select a suitable statistic for the item analysis. The belief that there were non-normal distributions underlying the item responses at once rules out most of the more popular techniques of assessing item validities. In addition, the dichotomous criterion and measure (item response) further limits the possible methods as does the fact that internal consistency is not important here.

Tetrachoric r had to be rejected because it assumes normal continuity of the underlying variables and the contingency coefficient was rejected because it can be compared to a Pearson r only if the categorized data assumes continuous, normal distributions. There are two main advantages in using a chi-square item analysis with this data. No assumptions have to be made as to the shape of the variables underlying the dichotomies and errors arising from extreme skewness are reduced, although not avoided, by use of the Yates (12) correction. Although the chi-square gives no direct assessment of validity, it does give an assessment of the significance of the discrimination if the items are ranked in order of their validity. Our prime interest will be served in that the chi-square will indicate which items are differentiating passes from failures to a significant degree as opposed to

those which are not.

McNemar (12) cautions against the use of small theoretical frequencies in the calculation of the chi-square. There is no basis for accepting or rejecting a hypothesis on the basis of this statistic when a theoretical frequency is less than 10 except when the value is extreme. Almost all investigators set the absolute minimum at 5. The Yates correction, in which each obtained frequency that is greater than expected is reduced by .5 and each obtained frequency that is less than expected is increased by .5, is a correction for continuity. This is needed when theoretical frequencies fall between 10 and 5 because chi-square varies with discrete jumps whereas computation by formula gives more continuous variations.

E. Statement of the Problem

In specific terms, the purpose of this study is to investigate the following hypothesis:

The more stable personality will be more successful in parachutist training than the unstable personality.

The well motivated subject will be more successful in parachutist training than the poorly motivated subject.

CHAPTER II

THE MEASURING INSTRUMENTS

A. Selecting Personality Items and Preliminary Study

The present study was contemporary with both the British (9) and American (6) studies previously discussed. The procedure adopted was empirical. From November 1952 until April 1953 both successes and failures of all serials arriving at CJATC were interviewed in an attempt to discover possible variables that might be significant in identifying those who would fail on parachutist training. Parachute instructors are usually fairly successful in identifying potential failures in the first week of the course before the more stress-producing phase begins. They were questioned as to the symptoms that were decisive in their judgement. This procedure is closely akin to the method of critical incidents proposed by Flanagan and reported by Guilford (7). He writes:

> This involves asking persons who are in the best positions to observe for reports of behaviors they have noted that led to failure and other behaviors that led to unusual success. After assembling such reports, noting common behaviors in either the failure or success list, one can make psychological abstractions of the traits probably involved.

It was noted in the interviews that subjects who failed tended to be more anxious, suffered more from undue weakness and fatigue, showed evidence of depressive reactions, reported more than average trouble with visceral functioning, and some reported reactions to past stress situations that

appeared to be of a hysterical nature. The instructors reported that they looked mainly for signs of lack of confidence with a lethargic attitude as a secondary clue. Observation of consistent tension and hesitation in situations requiring agility and decision were reported to be fairly reliable signs of impending trouble in the stress portions of the course.

The initial time allotted for psychological testing was one 50 minute period on the morning following the serials arrival. This curtailed experimental plans considerably. The original plan was to use the whole MMPI administered before the course started, do an item analysis against the pass-fail criterion of the course, construct a scale using the item analysis as a basis; and cross validate and generalize. Since it was not possible to administer the whole MMPI in the time allotted, and since no 2 or 3 scales tapped all the areas that it was thought desirable to sample, items were chosen on the basis of the experimenter's subjective opinion and on the basis of a qualitative analysis done on the MMPI in January 1953, (14). These were chosen to tap certain areas of behavior thought pertinent to the quality of a parachutist's performance by the experimenter. The selection of these areas was based on previous research reported above and on initial interviews by the experimenter. The groupings were tentative and served the purpose of forming a basis for the selection of items. Hathaway and McKinley used a similar method in organizing their original items for the MMPI (10). The Lie scale from the MMPI was added in an attempt to measure evasiveness.

There is no assurance that any item was properly classified merely because it was placed in one of the following groups:

1. Items relating to weakness and fatigue - 11 items
2. Items relating to anxiety - 45 items
3. Items relating to hysterical reactions - 14 items
4. Items relating to depression - 11 items
5. Items relating to concern over visceral processes - 14 items
6. The MMPI Lie Scale - 15 items

This group of 110 items (Appendix B) was administered to 50 parachutist instructors and parachutists who were employed at CJATC and a group of 50 failures from the then current serials and former failures who were still employed at the station. The items were scored in the direction considered significant on the MMPI marking keys. The mean of the successes was 23 with an SD of 7.10 while the mean of the failures was 33 with an SD of 13.14. There was a significant difference at well above the .01 level of significance so it was thought that the items were worth further development. After various experimental trials, standardized procedures were developed and beginning with serials 216 (March 1954) the group of items were administered to each serial of students before they commenced training.

B. Devising the Interest and Attitude Scale

Beginning with serial 226 in June 1954, 75 items (Appendix C), designed to tap the students interest in, and specific

attitudes toward jump training were added in a separate scale (Appendix C). The items were devised for the Interest and Attitude scale by the experimenter with a view to sampling certain areas that were considered significant. Again this does not mean that the grouping of the items was final or correct. The attitudinal and interest areas which the items attempted to probe are listed below:

1. Attitude toward the service and service discipline - 16 items
2. Self-confidence in relation to parachutist training. - 5 items
3. Attitude toward fellow soldiers on the serial - 5 items
4. Specific self-confidence in relation to height - 6 items
5. Knowledge of very simple facts about parachutist training designed to tap the subject's interest in the course - 20 items
6. An attempt to assess motivation through direct questions on the strength and duration of the subject's desire to take parachutist training - 8 items
7. An attempt to assess the importance of the extra pay parachutists receive in the subject's motivation - 5 items
8. An attempt to determine close relatives attitudes towards the subject taking the parachutists course. - 10 items

At this stage in the project, we had 110 items purporting to sample areas of personality important in performance on the parachutist course. In addition, there were 75 items that supposedly sampled attitudes that were also considered important in this criterion. We had, in effect, 185 short tests or samples of behavior.

C. Subjects Used

The sample used in this study consisted of all soldiers who arrived at CJATC for training as parachutists during the period of the study. Although they ranged in age from 17 to 40 their mean age was 19. All had been selected at Personnel Depots as being likely to adjust to an army environment before being enrolled and all had completed at least a basic course at their home units to prepare them for the training before being sent on course. All were volunteers for parachutist training. A course started each week and all candidates starting the course in any one week were organized into a serial. They stayed with that serial throughout the course.

The intake of candidates for each serial arrived on the Sunday of the week they commenced training. Monday morning was allotted to course administration and they reported to the Personnel Office for testing at nine o'clock for a one hour session. The experimental testing then, was completed before they actually started training. The actual experimental testing ran from March 1954 for approximately 24 months.

D. Criteria

At the time this study was carried out, the following course gradings in relation to the disposal of students were in effect:

> Average - Those students for whom the overall assessment by the Airborne School mentioned no major faults on their course. B gradings are almost non-existent.
>
> Low Average - Those students who had some weaknesses but who managed to correct them before the end of the course.
>
> Below Average - Those students who possessed major weaknesses that were not fully corrected by the end of

the course, and which detracted from their efficiency as parachutists were designated as below average. It was usually noted on their course report that further training would be necessary on return to their respective units. The actual course report remarks stated that the student lacked self-confidence, maturity, interest, encountered difficulty at the mock tower; displayed "nervousness" generally on the course; lacked physical coordination, or had difficulty combining flight and landing techniques at the high tower.

Medical Failures - Those students who were returned to their units because they did not meet the army medical standard for the course on arrival at the CJATC, developed ailments during the course, or were injured in the training, were called medical failures.

Disciplinary Failures - Those students charged with offences of a more serious nature against the National Defense Act or any charge under the civil code, were returned to their unit and were called disciplinary failures.

Psychological Failures - Those students who refused to exit from the mock tower or aircraft, those who just refused to go on with the course and those who performed in a dangerous manner because of tension, anxiety, or a lack of coordination, were termed psychological failures.

Physical Efficiency Failures - Those students who did not meet the standards of this test were returned to their unit without starting the training and were termed physical efficiency failures.

This study utilized dichotomous criterion groupings. The first is called the administrative pass-fail decision. The pass group included the average, low average, and below average gradings while the fail group included the medical failures, disciplinary failures, psychological failures and physical efficiency failures. The second criterion grouping compared the psychological failures only with the rest of the sample. The rest of the sample included the pass group of the first criterion grouping in addition to medical and physical efficiency failures.

CHAPTER III

METHOD

The decisions about the criterion and the method of item analysis has been made so it was possible to continue with the experiment. The 185 items were administered (Appendix A) to all English speaking serials from serials 226 to 259 inclusive, a total of 558 subjects. The decision as to whether a serial was English speaking or not was made on the basis of whether the subjects wrote the English or French translations.

The dichotomy was determined on the basis of administrative decision of pass or fail and a chi-square item analysis was done. There were 398 who were classed as pass and 160 who were classed as failures. Thirty-three of the 110 MMPI items and 15 of the 75 Interest and Attitude items survived at the 10 per cent level of significance with a chi-square of 2.706 or larger. Because the 33 items tapped personality variables primarily and because the 15 items were mostly concerned with more specific attitudes towards parachuting, it was considered reasonable that each should first be considered as a separate scale. The 33 item scale from now on will be termed X and the 15 item scale will be Z. They are listed as Appendix D and Appendix E respectively.

Each scale was scored on the group of 558 students from which they were derived, in which there were 398 who passed and 160 who failed. Using the administrative judgment

of pass-fail it was decided to check the difference between the means of our dichotomies to see if a significant difference existed. The null hypothesis to be tested would be that failures would not score significantly higher than the passes on Scales X and Z. As the scales had been derived from an item analysis on this sample, undoubtedly both the choice of the items and their keying took advantage of a great many factors. In view of this it is only prudent to expect considerable strinkage of the difference between the means on cross validation or generalization. The cross validation group consisted of 869 students on serials 260 to 290. There were 705 students who passed and 164 failures in this sample. The pass-fail criterion was the same and based entirely on administrative decision.

Because of the uncertainty of classifying the physical efficiency test failures, the medical failures, and the disciplinary failures with the "psychological failures" it was decided to consider those termed "psychological failures" against the rest of the population as a new grouping. In the validation sample of 558 there were 109 considered "psychological failures" which left 449 in the remainder.

In view of the fact that highly significant differences were found between the means of both Scales X and Z of those who passed and those who failed the parachutist course, it was decided to obtain a measure of the actual variance controlled.

A suitable measure had to be found. The data was in

the form of a continuous variable and a dichotomous criterion. It would appear that the biserial r would be the most appropriate measure. Thorndike (13) says in this respect, "The break into groups is considered to be arbitrarily imposed by some administrative condition and not to represent any fundamental or necessary break of the group at that point....... Implicit in the use of the biserial correlation coefficient is the feeling that what we are really trying to predict is amount or degree of the underlying quantitative variable."

Biserial correlations were computed on both X and Z on the validation sample of 558 and the generalization sample of 869. Pearson r's were computed as an estimate of the relationship between the two scales and it was then possible to calculate a multiple R as an estimate of the combined criterion variances controlled by both scales.

In the cross validation group there was considerable shrinkage of correlation or variance controlled. When testing for significant differences it was noted that the scales X and Z generalized better when the criterion grouping of "psychological fails" was contrasted with the rest of the population sample. It was decided to compute biserial correlation coefficients and multiple Rs on the validation and generalization sample using this new criterion. The reasoning for using the biserial r as a measure of correlation is the same as in the former instance when it was used.

CHAPTER IV

RESULTS

The CR of 7.52 for Scale X and 3.67 for Scale Z are both significant at above the .001 level. The multiple correlation of .49 is the best estimate of Scales X and Z combined.

TABLE I

ESTIMATES OF VALIDITY OF EXPERIMENTAL SCALES X AND Z USING THE DICHOTOMOUS CRITERION GROUPING OF THE ADMINISTRATIVE PASS-FAIL

Scale	Failures	Passes	Total	r_{bis}	Signif
X	N = 160 $\bar{X}$ = 8.33 SD = 2.83	N = 398 $\bar{X}$ = 6.34 SD = 2.63	N = 558 $\bar{X}$ = 6.90 SD - 2.83	.45 ±.05	CR = 7.52 Sig at .01 level
Z	$\bar{X}$ = 5.07 SD = 1.68	$\bar{X}$ = 4.27 SD = 1.50	$\bar{X}$ = 4.50 SD = 1.60	.30 ±.05	CR = 3.67 Sig at .01 level

In Table II the CRs of 5.19 for Scale X and 4.10 for Scale Z on the validation sample using the new criterion grouping of "psychological fail" contrasted with the rest of the sample are significant at the .01 level. The estimate of multiple correlation dropped to .47.

TABLE II

ESTIMATES OF VALIDITY OF EXPERIMENTAL SCALES X AND Z MEASURED AGAINST THE DICHOTOMOUS CRITERION GROUPING OF "PSYCHOLOGICAL FAIL" AND "REMAINDER OF THE SAMPLE"

Scale	Failures	Passes	Total	r_{bis}	Signif
X	N = 108 $\bar{X}$ = 8.70 SD = 3.10	N = 450 $\bar{X}$ = 6.46 SD = 2.65	N = 558 $\bar{X}$ = 7.00 SD = 2.85	.42 ±.05	CR = 5.19 Sig at .01 level
Z	$\bar{X}$ = 5.07 SD = 1.70	$\bar{X}$ = 4.36 SD = 1.11	$\bar{X}$ = 4.50 SD = 1.60	.26 ±.06	CR = 4.10 Sig at .01 level

The CR of 2.60 for Scale X and 4.03 for Scale Z are significant at above the one per cent level. The multiple correlation is estimated at .24 for both scales and is significant at above the one per cent level.

TABLE III

ESTIMATES OF THE VALIDITY OF THE EXPERIMENTAL SCALES X AND Z ON THE GENERALIZATION SAMPLE, USING THE ADMINISTRATIVE PASS-FAIL CRITERION GROUPING

Scale	Failures	Passes	Total	r_{bis}	Signif
X	N = 164	N = 705	N = 869		CR = 2.60
	$\bar{X}$ = 7.56	$\bar{X}$ = 6.82	$\bar{X}$ = 6.96	.14	Sig at .01 level
	SD = 3.36	SD = 2.84	SD = 2.96	± .05	
Z	$\bar{X}$ = 5.07	$\bar{X}$ = 4.36	$\bar{X}$ = 4.50	.25	CR = 4.03
	SD = 1.70	SD = 1.11	SD = 1.59	± .06	Sig at .01

Both correlations of .24 and .20 respectively are significant at much above the one per cent level. The multiple correlation of .30 is significant at above the .01 level.

TABLE IV

ESTIMATES OF THE VALIDITY OF EXPERIMENTAL SCALES X AND Z ON THE GENERALIZATION SAMPLE USING THE CRITERION GROUPINGS, "PSYCHOLOGICAL FAILURES" AND "REMAINDER OF SAMPLE"

Scale	Failures	Passes	Total	r_{bis}	Signif
$\bar{X}$	N = 103	N = 766	N = 869		CR = 2.69
	$\bar{X}$ = 8.16	$\bar{X}$ = 6.79	$\bar{X}$ = 6.85	.243	Sig at .01 level
	SD = 2.58	SD = 2.82	SD = 2.95	±.052	
Z	$\bar{X}$ = 5.39	$\bar{X}$ = 4.80	$\bar{X}$ = 4.87	.20	CR = 3.80
	SD = 1.48	SD = 1.58	SD = 1.58	±.05	Sig at .01 level

CHAPTER V

DISCUSSION OF RESULTS

A. The Criteria

It was not possible to control some known factors in the criterion performance on the course. First, the change of parachute from the T7 to the T10 caused a considerable lessening in the stress imposed. The evidence for this is that there were no failures at the aircraft stage in the generalization sample of 869 students who used the T10 parachute while in the validation sample in which there were 160 failures, 27 (17 per cent) were aircraft failures.

As the first sample comprised the group on which the selection instruments were devised and the second the group on which they were generalized it is thought that this change interfered considerably with a more satisfactory generalization.

The Physical Efficiency test was designed by the Chief Instructor at CJATC to measure the students physical aptitude for parachutist training. Units sending candidates are supposed to have administered this test before their dispatch. CJATC also gave the test to students on arrival. Very often the results of unit testing did not agree with the CJATC results and because of this it is thought that the test was of doubtful reliability. There was the possibility, often

mentioned by the instructors, that it provided a convenient method of evading the course for students who did not have the fortitude to persist. This may have been either a conscious or unconscious behavior phenomena. If the student did not pass the test he was returned to his unit without starting the course. There were 14 who failed this test in the validation sample and 46 who failed in the generalization sample. The relationship between scores on this variable and performance on the course is unknown. It would seem probable that such contamination could only result in a lowering of the criterion variance controlled by tests used in the study. However, because it was not possible to control the effects of the Physical Efficiency test in this experimental design, its effect must remain an open question.

During the period of the experiment, the amount of pressure exerted on unit commanders to select their candidates for the course more carefully varied from none to considerable. Information gathered from officers accompanying serials would suggest that this preselection and pretraining varied from none at all to the point where candidates were given almost the total first two weeks of training before proceeding on the course. This was especially troublesome in relation to items set up as simple questions about parachutist training designed to sample the student's interest in the course by measuring the amount that he had learned about the course on his own. For a time these items set up as a scale were predicting performance well and then quite suddenly the predictive.

power disappeared. Investigation showed that not only were units giving formal training, but in addition, the Officer Commanding Airborne School had commenced giving an introductory lecture on the course the period before they answered the test items.

The results obtained on the generalization sample would suggest that both Scales X and Z are controlling a small but significant portion of the variance contributing to performance on the parachutist course. The results are significant to the degree that one may reject with confidence the hypothesis that personality variables and motivation are unimportant factors in a subject's performance on the parachutist course.

B. The Measuring Instruments

The items chosen for the scales were empirically derived because they differentiated between passes and failures in the validation group. The low intercorrelation (.10) in both the validation and generalization sample would suggest that they are measuring different aspects of the criterion. If an additional item analysis were done against the second criterion grouping of psychological fail against the rest of the sample, one might find that the resulting scales would generalize more satisfactorily. There are two reasons for such a hypothesis. First, Grinker et al, in their study (6) strongly suspected discontinuity of the psychological failure category with all other failures and passers so it would not be proper to place them on a theoretical continuum from the worst prospects to the best. Secondly, in the present study the scales generalized better when "psychological fails" were considered

as a group against the rest of the sample.

Personality variables as measured by the items on Scale X are an important aspect of the subject's reaction to the stress on the parachutist training. It is believed that there is an even closer relationship than is shown by the results of this project. A more closely controlled criterion probably would have given better results. In addition, there is some reason to believe that the greater the stress involved the more important the personality factor becomes. Because of this, the obvious reduction of stress that followed the adoption of the T10 parachute probably interfered considerably with the generalization of Scale X.

In addition to this, the range of the samples was considerably curtailed at the Personnel Depots during the enrolment process. The MMPI is used to select subjects not likely to adjust to the army environment. Despite the interfering factors of uncontrolled variables in the criterion and curtailment of sample, the results demonstrated that a significant relationship existed between personality variables and performance on parachutist training.

The interest and attitude variables as measured by items found in Scale Z are thought to be important in the determination of a subjects performance on parachutist training. It is thought that contamination of the sample by pre-training and formal instruction on the subject matter of the course seriously obscured the actual variance controlled by such variables. In addition, effectiveness of the measuring instrument was probably seriously affected by the curtailment of the sample. On

enrolment, subjects are asked whether they are volunteers for parachutist training and only those who give a positive answer and meet other pre-requisites such as a personnel officers' assessment of fitness are posted to parachutist units as prospective parachutists.

There is some slight evidence that interest and attitude variables are less related to more extreme stress than are the personality variables. The shrinkage of correlation between the validation sample and the generalization sample was much smaller in the interest and attitude scale than the Scale X measuring personality variables. The assumed reduction of stress is attributed to the change from the T7 to the T10 parachute as it was discussed previously.

CHAPTER VI

CONCLUSION

It has been demonstrated that both personality and motivational variables are important in successful performance on the parachutist course. Keeping in mind the various changes, the relatively small drop in correlation from .47 in the validity sample to .30 in the generalization sample suggests that the scales were measuring variables that are consistent determiners of the quality of performance.

There was slight evidence confirming the discontinuity found by Grinker et al (6) between psychological and other types of failures.

The major contribution of this study is the demonstration that scales composed of personality inventory items and interest and attitude items can be used to predict behavior in a stress situation. Of particular interest is the fact that positive motivation is almost as important as the subject's personality structure in determining his reaction to a stress situation. In addition, it has demonstrated that this motivation can be measured to a degree by objective instruments. The rather crude interest and attitude tests used in this study could be further refined and modified for prediction in most anticipated stress situations.

A rather novel technique was the use of a subject's knowledge of facts about some simple aspects of the course

as a measure of his interest in it. It is thought that if it had not been for the contamination of its validity discussed previously that it would have continued as an effective and stable predictor.

CHAPTER VII

RECOMMENDATIONS

It is recommended that future research in this area correct two rather major deficiencies in this study. First the whole bank of 566 MMPI items should be administered and this administration should take place at the Personnel Depots. Second, there should be two sets of interest and attitude items--one to be administered at the Personnel Depot and one to be administered after the soldier has completed basic training. This is necessary because certain items that proved to be effective predictors are not suitable until the subject has had unit experience.

It is considered that the psychological "fail" group contrasted against the rest of the sample is the most satisfactory criterion because there is less subjective judgment involved. In addition, provision should be made for constancy in the conditions so that the rather drastic changes that detracted from this study would not recur.

Finally, it is believed that a subject's reaction to a known environmental stress-causing agency such as the parachutist course can be determined with reasonable accuracy if it is possible to assess with a certain degree of precision his past history, present personality structure and motivation to overcome the stress situations. It is thought that this

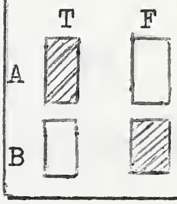
can be achieved through the use of inventory type tests, that include items sampling personality variables, interest and attitude variables, and biographical data.

You are about to write the prepara test in which you will be asked a total of 185 questions. The purpose of this test is not to determine how intelligent you are but to give the personnel officer an idea on how you think and act on different things and in different situations. The questions are very simple and there is no time limit involved, however, you must read them carefully and be sure you understand their meaning before answering.

(1) In answering the test read each question and decide if it is TRUE or FALSE in your case.

(2) Mark your answers as shown in the example to the right. If a statement is TRUE or MOSTLY TRUE as applied to you, blacken between lines in the column headed T. (See A at the right). If a statement is FALSE or NOT USUALLY TRUE as applied to you blacken between the lines in the column headed F. (See B at the right),

Section of answer sheet correctly marked.



(3) If a statement seems partly true and partly false, answer it by thinking of what happens most often.

(4) All of the questions must be answered exactly the way you feel or react in the circumstances described. For example Question 1, "I wake up fresh and rested most mornings." First of all ask yourself whether or not you do wake up fresh and rested most mornings. If you do, mark line in T column for true opposite No. 1; and if you do not, mark line in F column for false. Do not try to create a good or bad impression by answering the questions the way you think they should be answered.

(5) After correcting your test the Personnel Officer can usually determine whether or not you have answered the questions truthfully. If you have not, your results will be considered unreliable, and you will be asked to write it again.

(6) The results of this test are entirely confidential. Your answers are marked on a point system which makes your individual answers impersonal.

By answering these questions in the exact manner they relate to you, you will enable the Personnel Officer to assess your chances of completing the para course, and to help you should you encounter difficulties during training. Therefore, it is of utmost importance that you answer this test very carefully and consider only your own personal opinions in doing so.

Answer "ALL" the Questions.

MMPI NO:	ITEM
3	I wake up fresh and rested most mornings.
67	I wish I could be as happy as others seem to be.
7	My feet and hands are usually warm enough.
104	I don't seem to care what happens to me.
152	Most nights I go to sleep without thoughts or ideas bothering me.
8	My daily life is full of things that keep me interested.
2	I have a good appetite.
9	I am about as able to work as I ever was.
107	I am happy most of the time.
188	I can read a long while without tiring myeyes.
236	I brood a great deal.
30	At times I feel like swearing.
61	I have not lived the right kind of life.
18	I am very seldom troubled by constipation.
43	My sleep is fitful and disturbed.
248	Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world."
274	My eyesight is as good as it has been for years.
296	I have periods in which I feel unusually cheerful without any special reason.
45	I do not always tell the truth.
84	These days I find it hard not to give up hope of amounting to something.

APPENDIX B

(Cont'd..)

MMPI NO:	ITEM
63	I have had no difficulty in starting or holding my bowel movement.
51	I am in just as good physical health as most of my friends.
158	I cry easily.
62	Parts of my body often have feelings like burning, tingling, crawling or like going to sleep.
60	I do not read every editorial in the newspaper every day.
106	Much of the time I feel as if I have done something wrong or evil.
288	I am troubled by attacks of nausea and vomiting.
153	During the past few years I have been well most of the time.
242	I believe I am no more nervous than most others.
103	I have little or no trouble with my muscles twitching or jumping.
340	Sometimes I become so excited that I find it hard to get to sleep.
75	I get angry sometimes.
287	I have very few fears compared to my friends.
29	I am troubled by acid stomach several times a week.
155	I am neither gaining nor losing weight.
13	I work under a great deal of tension.
175	I seldom or never have dizzy spells.
6	I like to read newspaper articles on crime.
90	Once in a while I put off until tomorrow what I ought to do today.

MMPI NO:	ITEM
268	Something exciting will almost always pull me out of it when I am feeling low.
72	I am troubled by discomfort in the pit of my stomach every few days or oftener.
163	I do not tire quickly.
12	I enjoy detective or mystery stories.
192	I have had no difficulty in keeping my balance in walking.
32	I find it hard to keep my mind on a task or job.
105	Sometimes when I am not feeling well I am cross.
15	Once in a while I think of things too bad to talk about.
125	I have a great deal of stomach trouble.
189	I feel weak all over much of the time.
147	I have often lost out on things because I couldn't make up my mind soon enough.
273	I have numbness in one or more regions of my skin.
130	I have never vomited blood or coughed up blood.
120	My table manners are not quite as good at home as when I am out in company.
281	I do not often notice my ears ringing or buzzing.
10	There seems to be a lump in my throat much of the time.
243	I have few or no pains.
179	I am worried about sex matters.
356	I have more trouble concentrating than others seem to have.

APPENDIX B

(Cont'd..)

MMPI NO:	ITEM
76	Most of the time I feel blue.
135	If I could get into a movie without paying and be sure I was not seen I would probably do it.
22	At times I have fits of laughing and crying that I cannot control.
55	I am almost never bothered by pains over the heart or in my chest.
160	I have never felt better in my life than I do now.
94	I do many things which I regret afterwards (I regret things more or more often than others seem to).
47	Once a week or oftener I feel suddenly hot all over without apparent cause.
142	I certainly feel useless at times.
150	I would rather win than lose in a game.
341	At times I hear so well it bothers me.
230	I hardly ever notice my heart pounding and I am seldom short of breath.
279	I drink an unusually large amount of water every day.
305	Even when I am with people I feel lonely much of the time.
174	I have never had a fainting spell.
102	My hardest battles are with myself.
165	I like to know some important people because it makes me feel important.
*___	I feel too dizzy to work when I am in high places.
44	Much of the time my head seems to hurt all over.
217	I frequently find myself worrying about something.

---

* This item was devised by the experimenter to replace an MMPI item found to be unsatisfactory in that it lacked face validity on the pilot study.

(Cont'd..)

MMPI NO:	ITEM
186	I frequently notice my hand shakes when I try to do something.
301	Life is a strain for me much of the time.
180	I find it hard to make talk when I meet new people.
259	I have difficulty in starting to do things.
114	Often I feel as if there were a tight band about my head.
337	I feel anxiety about something or someone almost all the time.
187	My hands have not become clumsy or awkward.
343	I usually have to stop and think before I act even in trifling matters.
190	I have very few headaches.
240	I never worry about my looks.
351	I get anxious and upset when I have to make a short trip away from home.
194	I have had attacks in which I could not control my movements or speech but in which I knew what was going on around me.
86	I am certainly lacking in self-confidence.
195	I do not like everyone I know.
122	I seem to be about as capable and smart as most others around me.
330	I have never been paralyzed or had any unusual weakness of any of my muscles.
304	In school I found it very hard to talk before the class.
210	Everything tastes the same.

APPENDIX B

(Cont'd..)

MMPI NO:	ITEM
321	I am easily embarrassed.
225	I gossip a little at times.
344	Often I cross the street in order not to meet someone I see.
255	Sometimes at elections I vote for men about whom I know very little.
357	I have several times given up doing a thing because I thought too little of my ability.
270	When I leave home I do not worry about whether the door is locked and the windows closed.
361	I am inclined to take things hard.
362	I am more sensitive than most people.
40	Most anytime I would rather sit and daydream than do anything else.
159	I cannot understand what I read as well as I used to.
164	I like to study and read about things that I am working at.
178	My memory seems to be all right.
362	I forget right away what people say to me.

APPENDIX C

ITEM

1. Discipline in the army never irritates me.
2. I have a lot of friends in the unit with me and would sure hate to let them down by failing.
3. I feel extremely confused and panicky when in high places.
4. The service is the place for me. There is nothing in civilian life that compares with it.
5. I have always wanted to be a paratrooper since I can remember.
6. I would volunteer for the jump course even if there was no extra risk pay.
7. I think I have as good a chance as anyone of passing the jump course.
8. Because my mother or wife is against me taking a parachute course, as they think it is dangerous, it worries me.
9. Discipline is necessary at times but it sometimes makes me angry.
10. I have some friends in the unit and it would be nice to stay with them.
11. I feel dizzy when I work in high places.
12. There are certainly good opportunities in the army if you work hard.
13. The parachute opens shortly after you are dropped from the arm of the high tower.
14. The second jump from the aircraft is done at night.
15. I seldom make an important decision unless I consult my wife or mother.
16. I joined the army because I thought that they would train me as a paratrooper.

APPENDIX C

(Cont'd...)

ITEM

17. The thought of jumping out of an aircraft terrifies me - I don't know why I'm here.

18. I believe that it is essential to my service career to become a paratrooper.

19. The jumper descends at the rate of approximately 18 feet per second.

20. I suppose the army needs discipline so I like to keep out of trouble.

21. I have no good friends with the unit but they seem to be a good bunch and it would be good to stay with them.

22. I can never remember being in a place where I was aware of the height.

23. Opportunity in the army for advancement and an interesting life is about equal to that offered by civilian life.

24. Para descents are usually cancelled when the wind is over 18 MPH.

25. Although the extra risk pay is good I would ask to become a paratrooper without it.

26. No close member of the family is for or against me taking the parachute course.

27. Army discipline is too severe - that is why I often get into trouble.

28. The jumper is supposed to leave the aircraft on the given signal of the red light.

29. The lines from the parachute to the life webs of the jumper's harness are called suspension lines.

30. It is less than 6 months since I was married.

31. I have no friends with the unit and they don't seem to be a bunch I like.

(Cont'd..)

ITEM

32. As far as height is concerned, I am more sure of myself than most people.

33. I volunteered for the jump course because the routine around the unit is boring and I want a change.

34. It is my belief that my service career will not be affected by not passing this course.

35. My wife or mother is interested in me completing the course.

36. I did not desire to take jump training at first but I went along because my friends did.

37. There is no real need for discipline - as a result of which I get into trouble too often and am going to get out when my time is up.

38. Five para descents from an aircraft is the minimum required to qualify a paratrooper.

39. Being in high places does not bother me in the least.

40. There is no future for me in the army and I intend to get out as soon as possible.

41. The mock tower stands 45 feet from the ground.

42. Members of my family would be proud of me if I passed the parachute course.

43. The "torture racks" are really called the flight trainer.

44. One end of the anchor line cable is attached to the jumpers parachute and the other end is attached to the aircraft.

45. I could not get along with my parents when I lived at home.

46. I volunteered to take para training because I am in a jump unit.

(Cont'd..)

ITEM

47. All soldiers jump mainly because they get extra pay.

48. I am really more nervous of the jump course than I let the others know.

49. The C119 airplane that is used to carry and drop paratroopers can carry a maximum of 25 fully equipped jumpers.

50. I have never been afraid in my life.

51. I took jump training because I had to.

52. The T10 parachute used in para jumps from aircraft is approximately 32 to 35 feet across.

53. Risk pay should be higher.

54. The high tower used in para training is 150 feet high.

55. Our unit is the best jump unit in the army.

56. I take great pride in achieving difficult things.

57. There are more interesting jobs and more chances for advancement in the army than in civilian life.

58. The reserve parachute opens automatically if the main parachute fails to open.

59. The jumper and the extra equipment he carries hit the ground at the same time.

60. I seldom write home.

61. I like the unit I'm with and do not want to transfer to any other.

62. All parachutes are made of camouflaged material.

63. The jump course is easy - I can't see the reason for all this training.

64. As I am not re-engaging, it does not matter whether I pass or fail the course.

(Cont'd..)

ITEM

65. I became interested in paratroop training after I heard other soldiers talk about it.

66. Although I would like the wings and the extra pay the thought of the jump course makes me nervous.

67. The jump course is of four weeks duration.

68. The extra pay involved certainly will help me make up my mind to come on the jump course.

69. I believe that the best and most exciting life for a soldier is that of being a paratrooper.

70. My mother or wife is against me taking this parachute course but it does not bother me.

71. I don't like the unit I'm with.

72. There is no night jumping done by candidates under training.

73. The aircraft stops one engine while the jumping is in progress.

74. No students perform the task of stick leader before they qualify.

75. I cannot remember my parents.

MMPI NO:	ITEM	X^2
3	I wake up fresh and rested most mornings. (T)	5.976
7	My feet and hands are usually warm enough. (F)	2.673
188	I can read a long while without tiring my eyes. (F)	5.081
236	I brood a great deal. (T)	2.422
18	I am very seldom troubled by constipation. (F)	8.922
248	Sometimes without any reason or even when things are going wrong, I feel excitedly happy, "on top of the world". (F)	3.036
274	My eyesight is as good as it has been for years. (F)	2.518
296	I have periods in which I feel unusually cheerful without any special reason. (F)	3.744
288	I am troubled by attacks of nausea and vomiting. (T)	5.818
242	I believe I am no more nervous than most others. (F)	4.915
103	I have little or no trouble with my muscles twitching or jumping. (F)	5.102
287	I have very few fears compared to my friends. (T)	6.169
13	I work under a great deal of tension. (T)	4.493
175	I seldom or never have dizzy spells. (F)	3.225
6	I like to read newspaper articles on crime. (F)	3.832
163	I do not tire quickly. (F)	5.850
12	I enjoy detectives or mystery stories. (F)	2.679
105	Sometimes when I am not feeling well I am cross. (F)	3.891

APPENDIX D

(Cont'd..)

MMPI NO:	ITEM	X^2
130	I have never vomited blood or coughed up blood. (F)	8.480
243	I have few or no pains. (F)	5.516
76	Most of the time I feel blue. (T)	3.921
47	Once a week or oftener I feel suddenly hot all over without apparent cause. (T)	2.852
151	I would rather win than lose in a game. (F)	3.300
230	I hardly ever notice my heart pounding and I am seldom short of breath. (F)	7.327
279	I drink an unusually large amount of water every day. (T)	2.584
102	My hardest battles are with myself. (F)	4.443
180	I find it hard to make talk when I meet new people. (T)	4.144
187	My hands have not become clumsy or awkward. (T)	7.607
343	I usually have to stop and think before I act in trifling matters. (T)	4.497
190	I have very few headaches. (F)	5.515
194	I have had attacks in which I could not control my movements or speech but in which I knew what was going on around me. (T)	4.960
86	I am certainly lacking in self-confidence. (T)	3.723
261	I am inclined to take things hard. (T)	5.646

ITEM NO:	ITEM	
7	I think I have as good a chance as anyone of passing the jump course. (F)	17.648
8	Because my mother or wife is against me taking a parachute course, as they think it is dangerous, it worries me. (T)	5.588
10	I have some friends in the unit and it would be nice to stay with them. (F)	2.613
16	I joined the army because I thought that they would train me as a paratrooper. (F)	5.695
20	I suppose the army needs discipline so I like to keep out of trouble. (F)	10.175
23	Opportunity in the army for advancement and an interesting life is about equal to that offered by civilian life. (F)	8.508
24	Para descents are usually cancelled when the wind is over 18 MPH. (F)	2.693
34	It is my belief that my service career will not be affected by not passing this course. (T)	2.900
42	Members of my family would be proud of me if I passed the parachute course. (F)	8.479
53	Risk pay should be higher. (F)	4.770
55	Our unit is the best unit in the army. (F)	13.392
62	All parachutes are made of camouflaged material. (T)	3.900
67	The jump course is of 4 weeks duration. (F)	2.821
69	I believe that the best and most exciting life for a soldier is that of being a paratrooper. (F)	3.603
71	I don't like the unit I'm with. (T)	2.976

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